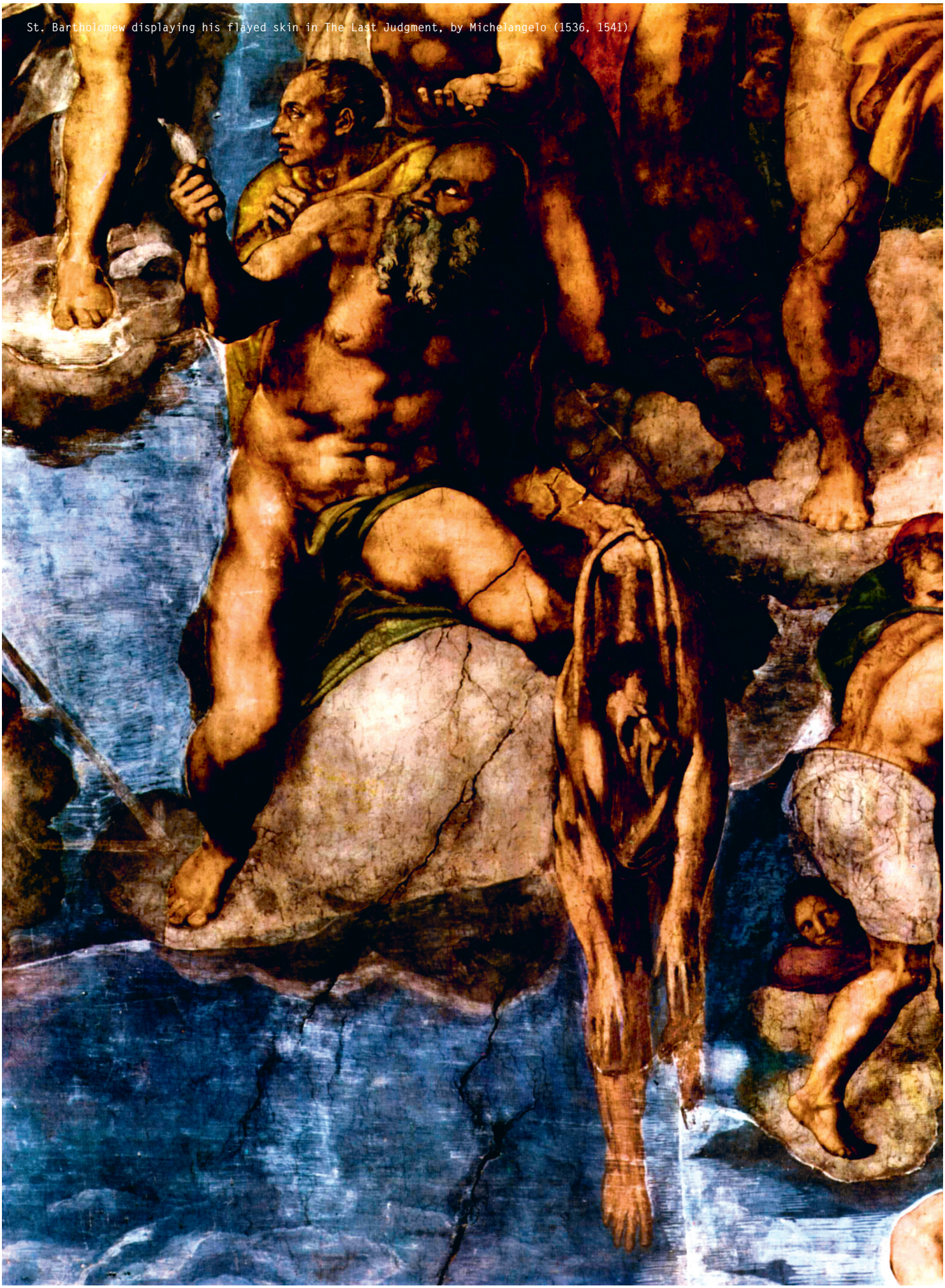
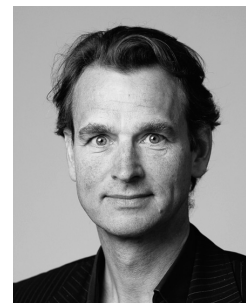


St. Bartholomew displaying his flayed skin in The Last Judgment, by Michelangelo (1536, 1541)

RESTORING OR VIOLATING BODILY INTEGRITY? BIO-ART AS A BIO-ETHICAL EXPERIMENT



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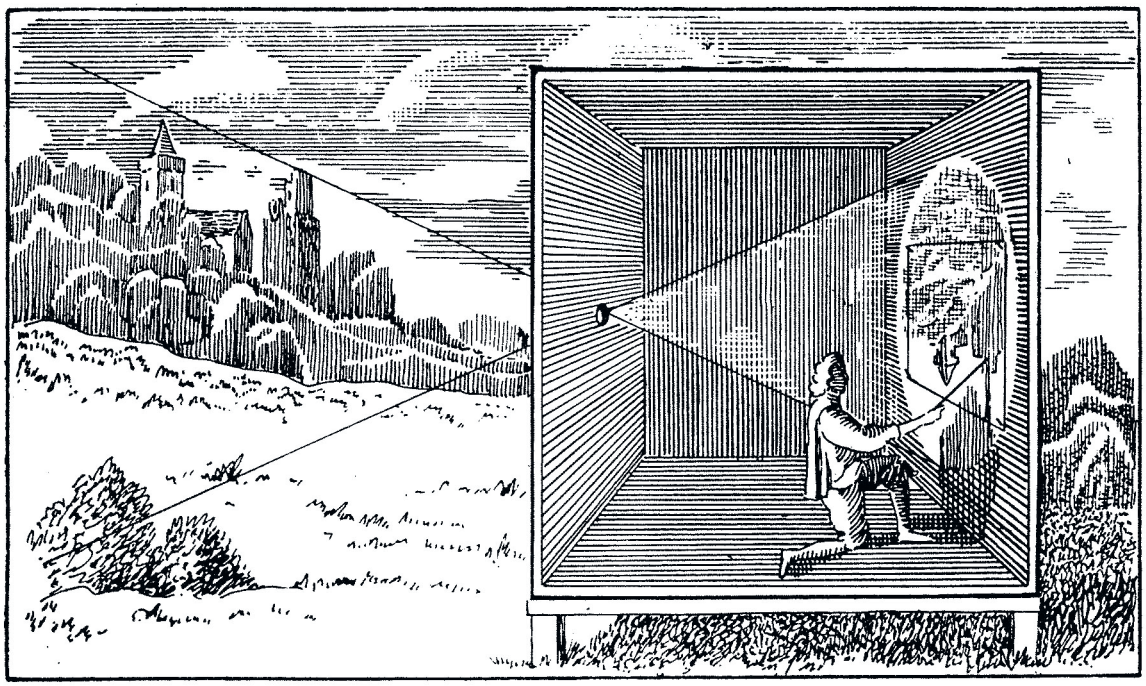
What is an image, sir? It is not a word I know

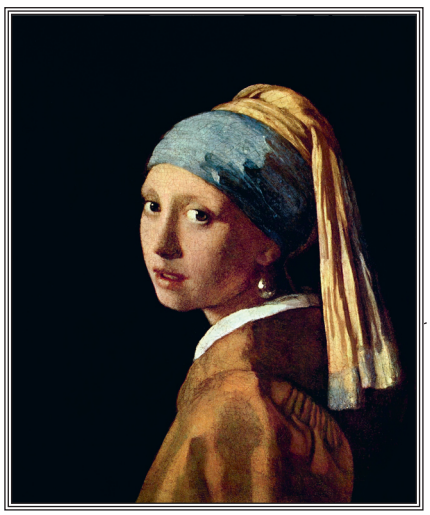
My paper consists of two 'layers'. First of all, building on two key examples (one taken from the 17th and one from the 19th century), I will point out that, from a historical perspective, collaboration and dialogue between art and science should be regarded as the norm rather than as the exception. Their segregation into two separate 'cultures' is a fairly recent phenomenon, and another iron curtain in the process of collapsing. Both art and science should be regarded as experimental endeavours--, the experimental design is what they have in common. Subsequently, the focus will shift to the *2.6g 329 m/s* artwork as a case study. From a philosophical perspective, I will explore what this exhibit actually achieves in the boundary zone between arts, science and society.

What is an image, sir? It is not a word I know
(Tracy Chevalier, 1999, p. 62)

LAYER I: **The experimental turn in art and science**

Girl with a Pearl Earring, the title of a famous painting by Johannes Vermeer, now in the *Mauritshuis* in The Hague, was granted a spectacular come-back as the title of the best-selling novel by Tracy Chevalier, published in 1999 and, subsequently, of a movie based on it, which premiered in 2003. According to Wikipedia, more than four million copies of Chevalier's book have been sold over the years. The story centres on the complicated triangular relationship between Vermeer himself (the tormented artist, brought to life by Colin Firth), his pregnant wife





Catharina, and their sixteen-year old household servant Griet (played by Scarlett Johansson), who acts as the narrator of the story and whose image, according to the novel, was immortalized by Vermeer's staggering portrait. Looming in the backdrop of this 17th century *ménage-à-trois*, however, is a second story line, to which the movie pays much less attention than the novel, concerning the remarkable friendship between Johannes Vermeer (1632-1675) and Anthoni van Leeuwenhoek (1632-1723).

In a detailed manner, the novel describes how closely Vermeer (the artist) and Van Leeuwenhoek (the scientist) worked together. They were fascinated by similar issues and concerns. And they deployed similar optic contrivances to live up to the challenges they were facing, notably the famous *camera obscura*, a device developed in order to focus and amplify the professional gaze, the visual sense of artists and scientists alike. Whereas Van Leeuwenhoek used optical instruments to explore the miniature world of micro-organisms, Vermeer used them to study the properties of space and light. But these were seen as converging endeavours, and both men (outstanding pioneers in their respective fields) were eager to exchange their experiences. In those days, a close proximity between art and science was still regarded as normal. The 'two cultures' divide, as propounded by Snow and others, had not yet been imposed.

At a certain point in the story, Griet is busy cleaning Vermeer's studio, and this is an important task, as cleanliness allows the artist to optimally study the properties of light, in a room that actually functions like an optical laboratory. While doing so, Griet's curiosity is triggered by the presence of an unusual object, a kind of box, which Van Leeuwenhoek had brought along. Precisely at that moment, the artist himself, somewhat unexpectedly, enters the room. He appreciates her interest in his work and invites her to have a closer look at the mysterious tool. He explains how it works: it is a dark chamber with a small opening and a lens. A bundle of light may enter it and project an 'image' upside down on the back wall. Apparently, in the 17th century, the word *image* is still a technical term, a neologism borrowed from scholarly Latin. He has to explain to her what it means. The camera is a tool, he says, 'I use it to help me see … My eyes do not always see everything … The camera obscura helps me to see in a different way … To see more of what is there' (p. 63/64).

In those days, art and science were complementary fields, mutually inspiring and fuelling one another. Van Leeuwenhoek was a scientist, but an artist as well, creating beautiful drawings of microbes and spermatozoa as produced by the optical contrivance, the microscope, which had made him world-famous. Vermeer was first and foremost an artist, but interested in research fields such as optics, geometry, geography and colour theory.

As I have argued more extensively elsewhere*, the arts and the sciences share a common, quintessential activity: both practices come down to conducting an experiment. Vermeer's paintings were experiments with colour, light and space, not unlike Newton's famous experiments with colour and light conducted more or less simultaneously. In fact, while Vermeer painted his *Girl with a Pearl Earring* in 1665, Newton performed his own famous optic experiments one year later, in 1666 (during his *annus mirabilis*). Art precedes science, as Heidegger (1957) argues, in exploring and opening up new possibilities of perception and experience, but both forms of optics, the artistic and the scientific one, display a similar basic, shared affinity in terms of interactivity and precision.

The arts and the sciences share a common, quintessential activity

This not only applies to the visual arts, however, but to other art forms as well. In 19th century France, for instance, writers such as Balzac, Flaubert and Zola gave rise to the naturalistic novel, regarding novel-writing as congenial to physiology and other scientific fields. Novels should abound in keen observations and facts. For Zola, an important source of inspiration was the work of physiologist Claude Bernard. As a youth, Bernard had wanted to become a playwright and he actually met with some success, but he was persuaded to abandon his literary aspirations and to take up medicine instead. Thus, he became the champion of vivisection, torturing and killing countless numbers of rabbits and dogs in the context of experiments and lectures. His wife and two daughters fiercely criticised him for what he was doing to his research animals, and domestic disagreements over animal experimentation were so intense that they actually ruined his marital life. Yet, he also had staunch supporters. One of them was novelist Emile Zola, who regarded Bernard as an example for literary authors and who, in a famous essay, introduced the idea of the 'experimental' novel (1880/1923). Novel-writing, Zola argues, is like conducting an experiment, exposing individuals to a series of conditions and challenges in order

* Notably in Denkstijlen ("Styles of Thought", 2005) and Understanding Nature (2008).

to study their responses as acutely as possible. For Zola, the concept of an experimental novel would put the art and practice of novel-writing on a scientific footing, as Bernard had done for medicine. In Bernard's famous *Introduction to Experimental Medicine* (1865/1966), one only had to replace the word 'physician' with 'novelist' and the manifesto of experimental literature was already written. Rather than merely *describing* the world, the experimental novelist should actively *intervene* in order to expose his characters to specific circumstances and events. Subsequently, he should carefully and meticulously study their behavioural reactions. According to Zola, the naturalistic novel *is* an experiment, in a strictly scientific sense of the term. The novel is a laboratory setting where physical, psychic and social phenomena may be studied systematically. Naturalistic novels must display the same level of detachment and precision as scientific research reports: Bernard's *Introduction* as a manual for novelists. In the next section I will argue that, in contemporary bio-art, as exemplified by the *Bulletproof Skin* project of Jalila Essaïdi, this core idea of the affinity and proximity of experimental science and experimental art is revivified again. It allows us to move beyond the two-cultures theorem that has been a dominating power in 20th century philosophy of art and science.

The affinity and proximity of experimental science and experimental art is revivified again

LAYER 2: **The dawning of bio-art**

Once again, art and science are now exploring ways to collaborate in an intensive manner. As I see it, bio-art is not 'representing' or 'criticising' science. Rather, it embarks on a complementary or flanking endeavour. In so doing, it reveals important aspects and dimensions of scientific research practices, such as tissue engineering and synthetic biology. Thus, bio-art becomes a laboratory practice in its own right, often conducted within scientific research settings. In artistic laboratories or science studios, the focus may gradually shift from the ontological and epistemological issues of the experimental life sciences to the ethical and societal spaces that are opened up by the type of research in question.

If we look closely at a human body, we easily notice that it is almost completely covered by skin. Apertures allowing us to see and hear and smell are quite minute in comparison the vast surface of our skin. Its basic function, as is already apparent from its anatomy, is to shield, protect and immunise us from the outside world and its countless looming threats, such as heat, cold or microbes. Weapons such as bullets are basically designed to destroy and penetrate this natural protective shield. As the pace of technological development is much faster than the pace of biological evolution, we seem defenceless against the power of knives, bullets and similar weapons - unless we come to the aid of our vulnerable skin through tissue engineering, allowing the body to produce bulletproof versions of the natural material.

The bulletproof skin project not only reveals the crucial role of our skin in the context of our being-in-the-world. It also displays the intimate connection that has always existed, since time immemorial, between warfare and science. From ancient metallurgy and ballistics up to poisonous gas and nuclear bombs, scientific research has flourished in the context of the arms race that has dominated much of human history, both on the aggressive and on the protective side. The bulletproof skin is an (albeit somewhat belated) response of vulnerable bodies to the emergence of swords and bullets.

Using cutting-edge science to offer evidence-based protection to soldiers in active service has become a major trend in contemporary high technology. Thus, the bulletproof skin can be seen in connection with similar developments such as the artificially enhanced retina, which, with the help of miniature bio-implants, may empower our eyes to discern body heat in the dark. Instead of providing soldiers with a kind of exoskeleton (such as a shield, a suit of armour or a bulletproof vest, as has happened in the past), new devices and materials are now entering human bodies, are becoming embedded. By mixing human skin tissue with cobweb biomaterials, soldiers may be transformed into something like Spidermen. They are bound to act as pioneers, but subsequently, others – top athletes, or even ordinary citizens - may profit from this as well. Through human enhancement, the vulnerable human body is transformed into a bionic bio-machine.

The role of bio-art, as I see it, is to explore the field, to allow snapshots of possible futures to light up in a probing way and to fill the emerging scene with moral question marks. Bio-art presents us with samples of the present and the future, by opening up pathways through evolving laboratory research practices.

What is a laboratory? Inessence, it is a camera obscura,

designed to keep the outside world at a distance, to forego intrusions, to intentionally create an impoverished, emptied, simplified world where the object of study may emerge as purely as possible, without blending into the multitude of things and events, as happens in real life. Again, in terms of cleanliness and transparency, it is similar to an artist's studio. In principle, what is going on in laboratory is hidden from the gaze of broader audiences. Claude Bernard, one of the founding fathers of modern laboratory life, taught his students that scientists should never communicate with lay audiences about what is actually going on in their laboratory. He urgently advises them *never* to enter into a discussion with laypersons on the moral aspects of (in his case: animal) experimentation. The public may well be invited into the drawing room of science, where the achievements of scientific research are proudly displayed, but they should never be allowed to enter the secluded, damp 'kitchen' where the dirty work is being done. Bio-art, however, allows us (laypersons) to enter the bio-scientific lab itself.

In order to describe our experiences as lab visitors, guided by bio-artists, a concept borrowed from psychoanalysis may prove rather helpful, namely 'the uncanny' (Freud 1919/1947). It applies to entities that we are familiar with, but that are somehow detached from their normal context. Notably, the concept applies to body parts that are separated from the body itself, such as eyes and hands. But it may also apply to skin. There is a story that Bartholomew, one of the disciples of Jesus, was skinned alive as a martyr. Therefore, quite often, he is portrayed holding his own skin. Michelangelo's version in the Sistine Chapel may be the most famous example. Such an exhibit of human skin, as a piece of art, is bound to strike us as uncanny. Whereas Bartholomew's skin is restored through Divine intervention, a bulletproof skin is strengthened by man-made tissue engineering. Thus, Jalila's project can be interpreted as an experiment in ethics. It probes our responses to what may be happening in bio-labs, now or in the near future. It exposes audiences (as bio-artistic 'research subjects') to novel entities that have not yet become embedded in the web of life, in the social tissue of our world, allowing us to assess and explore their responses in a detailed way, paving the way for bio-ethical discourses of the future.

It probes our responses to what may be happening in bio-labs, now or in the near future

The fact that, of all the parts and organs of the body, the skin is singled out to play this role is no coincidence, I think. First of all, from an epistemological perspective, the skin is the organic version of the protective wall that isolates both labs and studios from the interfering and contaminating outside world. Skin (representing physical isolation) is something science and art both are familiar with. But there is another, ethical reason why our skin is special. As organic tissue, our skin is closely related to one of the key concepts of bio-ethics, namely bodily 'integrity'. The term integrity basically means wholeness. To damage the skin, by piercing a hole through it, amounts to damaging the integrity or 'inviolability' of the body – inviolability in the ethical and legal, that is 'symbolical', sense. The vulnerable skin is made 'inviolable' by means of ethical principles and legal laws. We are not allowed to touch, let alone pierce, someone's skin, either in the context of love, tattooing or health care, without his or her consent. The bulletproof skin project, however, aims at restoring and boosting the inviolability of the body in a literal, physical sense. It exemplified the shift from symbolic ('soft') immunisation (relying on religion, ethics and law) to technological ('hard') immunisation. Bartholomew's integrity was safeguarded and restored by faith and divine intervention, but Jalila's project demonstrates that, nowadays, we tend to rely on tissue engineering when it comes to enhancing the inviolability our skin. Paradoxically, in order to achieve this, the integrity of the skin must first be violated, by separating it from the body and uncannily reducing it to technologically reproducible in-vitro-skin.